

Coffee Production: Sustainability, Eco-Friendly Practices, & Social Impacts



Annotation:

This lesson will provide students with knowledge on the history of coffee, cultivation, production, and harvesting of coffee. In addition it will cover coffee growing regions and types of coffee trees and beans. Students will learn about how coffee is differentially cultivated to produce medium vs. dark roast coffee products. Social lessons will include the connections of large coffee companies such as Starbucks and local farmers working for such companies. In addition, fair trade certificates and organizations like CARE which provide relief to underdeveloped countries where coffee is usually grown will be discussed.

** Note this PowerPoint presentation has been modified from the Starbucks website as well as from the University of Georgia's Science Behind Our Food NSF GK-12 trip to Costa Rica. This lesson includes a taste-testing experiment where students try to determine if they can taste the difference between sun vs. shade-grown coffee and medium vs. dark roast.

Primary Learning Outcome:

Students should understand how social and environmental factors affect the production of major cash crops such as coffee. Students will learn the basic agricultural practices involved in cultivating coffee and will be exposed to the idea of sustainability and environmental health. Students will learn to think about agricultural products they consume in their daily lives as part of a global market and decipher what economical impacts such crops have on developing countries.

Assessed QCC's:

Biology:

Topic: Science Process Skills, and Laboratory Safety

Standard: Uses terms and processes employed in scientific research

1.1 Demonstrates proficiency in the use of science process skills in laboratory and /or field activities involving observation, classification, communication, metric measurement, prediction, inference, identifying variables, formulating hypotheses, controlling variables, making operational definitions, designing investigations, experimenting, collecting qualitative and/or quantitative data, constructing a data table, graphing, analyzing, and interpreting data and/or drawing conclusions.

Topic: Diversity of Life (Kingdom Plantae: Seed Producers)

Standard: Describes the similarities and differences of seed producing plants.

19.4 Describes the importance of seed plants for food, medicine, and other products.

Botany:

Topic: Economic Botany

20.3 Identifies major food plants.

20.5 Identifies the role of plants in history.

20.6 Analyzes the importance of agriculture to society.

Materials:Taste-test Materials:

For ~ 30 students:

4 coffee machines...or can use one coffee machine and prepare four coffee varieties prior to class and store in thermos containers (make sure to thoroughly clean coffee machine between brewing of each coffee variety)

1 bag Folgers or any generic type coffee medium roast

1 bag Folgers or any generic type coffee dark roast

1 bag Starbucks or any shade-grown coffee (should say on bag!) medium roast

1 bag Starbucks or any shade-grown coffee (should say on bag!) dark roast

small Styrofoam cups

coffee filters

napkins

** If sugar/cream is used the same amount and type must be used in each sample to ensure standardization for the taste-test. It is recommended that no sugar or cream is used so that students are getting the “raw” flavor of the coffee.

Teaching Materials:

Taste-Test Protocol sheet

Taste-Test Response sheet (4 per student)

PowerPoint projector/computer capabilities for coffee PowerPoint presentation

Total Duration:

1.5hrs.

Procedures:

Step 1	
Description	Coffee PowerPoint presentation
Duration in hours/minutes	50 minutes
Attachment #1 – Name and description	Coffee PowerPoint
Step 2	
Description	Taste Testing
Duration in hours/minutes	20 minutes
Attachment #1 – Name and description	Taste Testing Protocol and Response Sheets
Step 3	
Description	Discussion of Results
Duration in hours/minutes	20
Attachment #1 – Name and description	Taste Testing Protocol

Assessment:

This lesson will be assessed by having students discuss their taste-testing results. As a class students should hypothesize why they might have or have not been able to differentiate between sun/shade and medium/dark coffee selections based on taste.

Extension:

Students may perform individual research projects on organizations such as CARE and determine their significance in the global economy and agricultural markets.

Remediation:

Students should be helped to draw the steps in coffee cultivation using diagrammatic flow charts or images. Additionally, a discussion their own personal consumption of coffee/related products may be helpful to demonstrate the impact of cash crops like coffee in everyday life.